On the Decline of the Visual Magnitude of Variable 159. 1904 *Pegasi as observed at the Radcliffe Observatory, Oxford.*

By Walter Wickham.

The *Zirkular Nr.* 68 *der Zentralstelle*, announcing the discovery by Mr. A. Stanley Williams of an apparently new star preceding B.D. 29°·4655, was received at Oxford on October 8, and the same evening the star was found in the place indicated, using the Barclay 10-inch equatorial.

The following four B.D. stars are conveniently situated for comparison, but are so nearly of an equal magnitude that it has not been easy to formulate a descending scale from them. The magnitudes here set down are those of (1) the original B.D., (2) the Cambridge (England) zone of the A.G.C., (3) my own readjustment of the values after careful comparisons on October 8, 11, 13, 18.

	B.D.	Camb. A.G.C.	Radc. 1904.
B.D. + 29·4659	8·8	9·0	9·11
·4652	8·9	8·9	8·91
·4653	9·2	9·1	8·79
·4655	9·1	9·1	9·01

The whole of the field was surveyed and provisional magnitudes assigned to about twenty of the fainter stars, extending the Argelander scale in descending steps by extrapolation. The results for the Stanley Williams star were :

	Oct. 8.	Oct. 11.	Oct. 13.	Oct. 18.	
	9·48	9·53	9·48	9·41	
from	(8)	(10)	(11)	(22)	comparison stars.

The close agreement of these values showed that there was very little, if any, change in magnitude. This conclusion was confirmed in *Ast. Nach.* 3971, 174–6 by Professor Pickering's telegram of October 7, "Williams star, long period variable, considered by spectrum," and by the notification of October 8 from Herr P. Gotz, Astrophysical Observatory, at Königstuhl, that on August 6–8 the star was nearly of the same magnitude as B.D. + 29°4653 (9·2 mag.). In *Ast. Nach.* 3973, 207–8, there appeared a note from Professor E. C. Pickering, "The Harvard photographs show that this object has existed for several years and is variable." Professor Max Wolf has published a chart of the region of the variable in *Ast. Nach.* 3977, 267–8, but does not mention the brightness, either visual or photographic, of the star on October 9, when the photograph was taken from which is reproduced the sketch he publishes.

The whole staff of this Observatory being engaged in other work of a routine character, and the clear nights so rare, no further attention could be given to this star until December 3,

when I found that it had decreased in brightness by a whole magnitude. No opportunity for observation has since been lost, and the determinations are as follows:

	Dec. 3.	Dec. 5.	Dec. 7.	Dec. 8 (sky becoming foggy).	
	10·50	10·44	10·56	10·55	
from	(12)	(15)	(17)	(6)	comparison stars,

with a redetermination of their magnitudes.

As previously intimated the scale on which these estimations have been made will probably require revision when standard photometric values of the brightness of the comparison stars have been published elsewhere; but it seemed advisable, in view of this large change of brightness, to enlist the attention of observers who can follow the star with effective instruments should it continue to decrease to the point of visual extinction.

The colour has been red throughout, increasing as the star diminished, as was the case in the early changes of *Nova Persei*. Photographs taken with the 24-inch refractor of this Observatory on October 8 and December 5 show the change of photographic effect very markedly.

Radcliffe Observatory, Oxford:
1904 *December* 8.

On the Relative Brightness of Binary Stars.

By J. E. Gore, F.R.A.S.

In my *Catalogue of Binary Stars*, published by the Royal Irish Academy in 1891, I gave the "relative brightness" and "hypothetical parallax" for all the binary stars for which orbits had then been computed. The "relative brightness" was calculated from Mr. Monck's formula, the standard star being *ξ Ursæ Majoris*, of which the brightness was assumed as unity. Since that time numerous other orbits have been computed. From all these orbits I have selected those which seem to be the most accurately determined, and have recomputed the "relative brightness" and "hypothetical parallax" of forty-eight binary stars. My former catalogue contained fifty-nine stars, but for some of these the orbits have not proved satisfactory, and better orbits have been computed for others. I have adopted Dr. See's orbit for *ξ Ursæ Majoris*, and with his values of P, the period in years, and *a*, the semi-axis major in seconds of arc, Mr. Monck's formula becomes

$$k = 10^{0\cdot4(3\cdot86-m)}\left(\frac{P}{60\cdot0}\right)^{\frac{1}{3}}\left(\frac{2\cdot508}{a}\right)^{2}.$$